

applying the metal-organic complex onto a heated substrate, said metal-organic complex comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_x$, where:

Me is a metal selected from the group consisting of Cr, Mn, Co, Ni, Cu, Y, Zr, La and lanthanides, Mg, Ca, Sr, and Ba;

A is the valence of the given chemical element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8,

wherein in order to manufacture the interface layer protecting a previous layer from a restorative gas medium, a mixture of compounds is used comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_x$, where:

Me is a metal selected from the group consisting of Zr, Y, La and lanthanides;

A is the valence of the given chemical element (metal); and

X is an integer from 1 to A; and

further comprising the step of applying the mixture is performed by painting the substrate heated up to the temperature not higher than 430°C in the atmosphere of an inert gas forming a protective interface layer of not greater than 5 µm in thickness on the surface of the doped zirconium dioxide.

A11 47. (AMENDED) The method according to Claim 45, wherein the concentration of metal selected from the group consisting of nickel and cobalt in said liquid phase of metal carboxylates is from 20 to 70 g per kg of the carboxylate.

REMARKS

Amendments have been made to more clearly claim the invention. No new matter is added herewith. Changes to the claims can be seen on a separate page entitled VERSION WITH MARKINGS TO SHOW CHANGES MADE following the signature page. Deletions are in [bold and brackets] and insertions are underlined.

Applicants note that the Examiner has not recognized the foreign priority date of the present application, because foreign priority documents have not been provided. Applicants wish to note that the following arguments should not be considered admissions that any or all of the

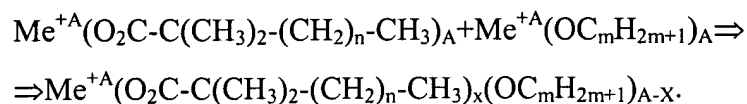
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cited reference are prior art. Applicants reserve the right to argue against cited references which would not be considered "prior art" under 35 U.S.C. § 102 and 103, in light of the priority documents.

Claim Rejections under 35 U.S.C. § 112

Claims 1-5 were rejected under 35 U.S.C. § 112, second paragraph for reciting the term "Gr" and for providing a subscript "a" without a range. Applicants have amended Claim 1 to correct these typographical errors. "Gr" has been changed to "Cr", which refers to the element chromium. "a" has been replaced with "n" for which a range has been given. These corrections rectify these minor typographical errors, thus Applicants respectfully request withdrawal of the rejection on this basis.

Claims 12-24 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite for reciting an undefined metal-organic for use in manufacturing the electrolyte which is mixed with metal carboxilates or metal alcoholates containing undefined metals which may be the same or may be different. The Examiner indicates that a metal or group of metals should be defined to clarify the bounds of the claim. Applicants assert that amended claim 12 more clearly claims the invention and sufficiently identifies metal-organic compounds according to the presently claimed invention. Amended Claim 12 recites, *inter alia*, a metal-organic compound wherein the metal-organic compound for manufacturing the solid oxide electrolyte is synthesized using the reaction:



Furthermore, the specification describes the method of Claim 12 in paragraphs 170 through 179. Applicants assert that the term metal-organic is supported by the specification and is more clearly defined in amended Claim 12.

Claims 15-17 and 19 were rejected for reciting the limitation "the step of synthesizing the zirconium alcoholate", which lacks antecedent basis. Claim 15 has been amended to provide antecedent basis.

Claims 20 and 21 were rejected for reciting the limitation "the modified zirconium dioxide", which lacks antecedent basis. Claim 20 has been amended to provide antecedent basis.

Claims 22 and 30 were rejected for reciting the limitation "the inert medium", which lacks antecedent basis. Claims 22 and 30 have been amended to provide antecedent basis.

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Claim 29 was rejected for reciting the limitation "the air medium", which lacks antecedent basis. Claim 29 has been amended to provide antecedent basis.

Claim 28 was rejected for reciting the limitation "the concentration of Cr, La, Sr, Mg, Ca in the mixture of liquid carboxylates", which lacks antecedent basis. Claim 28 has been amended to more clearly claim the invention.

Claim 47 was rejected for reciting the limitation "said liquid carboxylates", which lacks antecedent basis. Claim 47 has been amended to more clearly claim the invention.

Applicants respectfully assert that the present claims clearly claim the invention. Applicants respectfully request withdrawal of the rejections under 35 U.S.C. § 112, second paragraph.

Claim Rejections Under 35 U.S.C. § 102

Claims 6, 7, and 11 were rejected under 35 U.S.C. § 102(b) as being anticipated by Pederson et al. The Examiner asserts that Pederson teaches "a method for manufacturing a ceramic cathode comprising precipitating lanthanum and manganese nitrates in combination with metals including La, Mn, Ni, Cr and Co (column 3, lines 30-44) and metal carboxylates (column 4, lines 5-21)". Column 4, lines 5-21 of Pederson, cited by the Examiner, does not comprise the term "metal carboxylates", but only the term "carboxylic acid". The "carboxylic acid" of Pederson is used only for flaming combustion after a complete evaporation of water from the mixture of dissolved nitrates. As a result of flaming combustion (at a temperature not less than 1700°C), ashes of nanopowder is formed. This is the final product according to Pederson, but there is no disclosure regarding manufacturing the cathode itself from this powder. Pederson discloses forming pellets from such a powder, but does not disclose preparing a formable mass by isostatic compacting of a composition comprising the powder and an organic binding component. In addition, in part 13 (page 9) of the Office Action, the Examiner specifically states that in Pederson "there is no disclosure of binder content". Thus, it is unclear how Pederson can anticipate the presently claimed invention. Applicants assert that Pederson does not disclose all elements of the presently claimed invention recited in Claims 6, 7, and 11. Thus Applicants respectfully request withdrawal of the rejection on this basis.

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Claims 1-5, 12-15, 24-29, 33-35, 37, 38, 40, 41, 44-47, 52, 54, and 56 were rejected under 35 U.S.C. § 102(e) as being anticipated by Mukherjee et al. The Examiner asserts that Mukherjee teaches "a method for manufacturing a fuel cell comprising formation of an electrolyte, cathode and anode". Mukherjee is directed towards a method for manufacturing an electro-chemical cell, in other terms a battery for domestic appliances, which is not applicable to high-temperature solid oxide fuel cells (SOFC). The electrolyte in a battery is liquid or paste-like, while the SOFC has a solid ceramic electrolyte. Furthermore, metal-organic compounds employed by Mukherjee are included as a component of a liquid electrolyte placed into a working medium of an electric battery, which is restricted within the space between cathode and anode and intended to operate at room temperature. In contrast, high-temperature fuel cells are intended for operating at 600-1100°C. The organic compounds of Mukherjee cannot operate at such temperatures. Claim 1 specifically recites "a metal-organic complex used to manufacture high-temperature fuel cell components to be applied, interfaced, and caked." No such recitation of use in high-temperature fuel cell components is found in Mukherjee. Applicants respectfully assert that Mukherjee does not anticipate the presently claimed invention, and Applicants respectfully request withdrawal of the rejection on this basis.

Claims 6, 8-10, 25, 27-30, and 32 were rejected under 35 U.S.C. § 102(e) as being anticipated by Zhen et al. Zhen teaches manufacturing a nanosize ceramic powder included in a polymer foam. Claims 6 and 8-10 relate to manufacturing of a cathode, and claims 25, 27-30 and 32 relate to manufacturing of a film solid oxide electrolyte on the surface of the carrier cathode. The presently claimed solid oxide electrolyte film is manufactured directly from a metal-organic complex in the form of an oxide ceramic on a cathode surface. Zhen et al. only teaches manufacturing nanosize powders. Applicants respectfully assert that the presently claimed invention is not anticipated by Zhen, thus Applicants respectfully request withdrawal of the rejection on this basis.

Claims 25, 27, 29, 40, 44, 46, and 48 were rejected under 35 U.S.C. § 102(e) as being anticipated by Xue et al. The presently claimed invention is directed towards manufacturing anodes and current passages themselves, while Xue discloses a method for connecting anodes and/or anode and current passages electric-conductively during assembling stacks of fuel cells.

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The fuel cells themselves, as well as their anodes, are made in advance and in accordance with other technologies. The technology of assembling the stack of Xue is briefly as follows: a glue paste is applied onto an anode of a prepared cell, another cell is pressed with its anode to the anode of the first cell, and they both, in the pressed condition, are placed into an oven at 1350°C. Xue discloses a blowing agent, solvent, plasticizer and binding component, all of which are various organic materials. The presently claimed invention is directed towards the use of a single organic material, which replaces all above functions, preferably dimethyl-butyl-acetic acid. Moreover, this material is employed in the form of dimethyl-butyl-acetic nickel and/or cobalt, which prevents shrinkage cracks at the final thermal treatment of a fuel cell since the shrinkage ratio is close to zero. Applicants respectfully assert that Xue does not anticipate the presently claimed invention, thus Applicants respectfully request withdrawal of the rejection on this basis.

Claim Rejections Under 35 U.S.C. § 103

Claims 8-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Pederson et al. in view of Mukherjee et al. Pederson discloses forming pellets from a nanopowder, but does not disclose preparing a formable mass by isostatic compacting of a composition comprising the powder and an organic binding component. Pederson also lacks disclosure of a metal ratio in the organic. The Examiner indicates that it would have been obvious to use binders taught by Mukherjee. Mukherjee is directed towards a method for manufacturing an electro-chemical cell, in other terms a battery for domestic appliances, which has no relation to high-temperature solid oxide fuel cells (SOFC). The electrolyte in a battery is liquid or paste-like, while the SOFC has a solid ceramic electrolyte. SOFC could not be manufactured by methods disclosed by Mukherjee. Furthermore, metal-organic compounds employed by Mukherjee are included as a component of a liquid electrolyte placed into a working medium of an electric battery, which is restricted within the space between cathode and anode and intended to operate at room temperature. In contrast, high-temperature fuel cells are intended for operating at 600-1100°C. The organic compounds of Mukherjee cannot operate at such temperatures. Applicants assert that it would not have been obvious to one of skill in the art to combine these references to make the presently claimed invention. Applicants assert that the presently claimed invention is patentable over the combination of Pederson and Mukherjee.

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Claims 16, 18, 19, 32, 53, and 55 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukherjee et al. in view of Zhen et al. Mukherjee is directed towards a method for manufacturing an electro-chemical cell, in other terms a battery for domestic appliances, which has no relation to high-temperature solid oxide fuel cells (SOFC). SOFC could not be manufactured by methods disclosed by Mukherjee. Metal-organic compounds employed by Mukherjee are included as a component of a liquid electrolyte placed into a working medium of an electric battery, which is restricted within the space between cathode and anode and intended to operate at room temperature. However, high-temperature fuel cells are intended for operating at 600-1100°C. The organic compounds of Mukherjee cannot operate at such temperatures.

The presently claimed invention provides a non-shrinkable sintering of a cathode at lowered temperatures without loss of mechanical and electrical properties. The temperature at which sintering of the cathode takes place is lower than the synthesis temperature of a powder used for manufacturing the cathode. This is described in detail in the section "Disclosure of the Invention" at pages 22-24, as well as in Examples 1-3. According to the presently claimed invention a shrinkage of the cathode during the sintering is ~0.5%, instead of 20% which traditionally results from manufacturing ceramic articles. The presently claimed invention preferably employs carboxylates indicated in Example 1 of the specification. In the case of employing other organic materials indicated by the Examiner, the above effect is not observed. Applicants assert that the presently claimed invention is patentable over the combination of Mukherjee and Zhen.

Claims 20-22, 30, 49, 50, and 51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukherjee et al. in view of Bickmore et al. Mukherjee has been addressed above. Bickmore is directed towards combustion of emulsions as a method for producing fine powders. The combination of Mukharjee and Bickmore do not provide disclosure of a high-temperature solid oxide fuel cells (SOFC) according to the presently claimed invention. The compounds of Mukharjee cannot operate under conditions required for SOFC, and Bickmore does not provide additional disclosure which would make the compositions of Mukharjee applicable to SOFC. Thus, Applicants assert that the presently claimed invention is patentable over the combination of Mukharjee and Bickmore.

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Claims 20-22, 30, 49, 50, and 51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mukherjee et al. in view of Jensen. Mukherjee has been addressed above. Jensen is directed towards manufacturing a fuel electrode on an electrolyte produced with the CVD and EVD method. Jensen uses the EVD method for making an anode. Producing electrolytes with the CVD and EVD method was developed by the Westinghouse Electric Corp. (USA). The method is based on processes of chemical vapor deposition and electrical vapor deposition which decompose gases $ZrCl_4$ or ZrF_4 together with gases YCl_3 or YF_3 at a temperature of $1400^{\circ}C$ on the surface of the carrier cathode. Halogenide vapors (especially at a temperature of $1400^{\circ}C$) pose a substantial danger to both the environment and to people's safety. This danger is described in detail in the "Background of the Invention" of the present specification. Preferably processes according to the presently claimed invention are performed at atmospheric pressure, a temperature of about $500^{\circ}C$, without poisonous chlorine and fluorine, and the whole apparatus for depositing is small enough to place on a writing-table, while the CVD and EVD processes occupy a five-floor building. The presently claimed invention provides significant advantages over the combination of Mukherjee and Jensen. Applicants assert that the presently claimed invention is patentable over these references.

Allowable Subject Matter

Applicants wish to thank the Examiner for identifying allowable subject matter in Claims 17, 23, 31, 36, 39, 42, and 43, which were objected to for being dependent on rejected claims. Applicants have amended these claims such that they no longer depend from rejected claims, thus Applicants assert that Claims 17, 23, 31, 36, 39, 42, and 43 are allowable.

Conclusion

In view of the foregoing amendments and remarks Applicants assert that the present application is allowable. Should any issues arise which may delay prosecution of the present application the Examiner is respectfully invited to contact the undersigned at the telephone number below.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: Dec. 4, 2002

By: Catherine M. Sanders

Catherine M. Sanders
Registration No. 50,660
Agent of Record
Customer No. 20,995
(949) 760-0404

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Deletions are in **[bold and brackets]** and insertions are underlined.

IN THE CLAIMS:

Please amend the following claims:

1. (AMENDED) A method for manufacturing a high-temperature fuel cell, comprising:

manufacturing a cathode;

applying at least one electrolyte and anode; and

thermally treating a whole construction of the high-temperature fuel cell, wherein after manufacturing the cathode, a step of applying an interface layer, a current passage, the electrolyte, the anode and an electrical insulating layer is performed using the same apparatus, and wherein

a metal-organic complex used to manufacture high-temperature fuel cell components to be applied, interfaced, and caked is prepared having the **[common]** formula:

$[\text{CH}_3-(\text{CH}_2)_{[a]n}-\text{C}(\text{CH}_3)_2-\text{CO}_2]\text{Me}^{+m}$, where

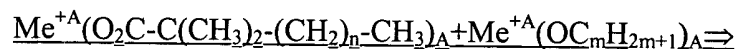
n is from 1 to 7,

m is a metal valence, and

Me is a material selected from the group consisting of Mg, Ca, Sr, Ba, Al, Sc, Y, In, La and lanthanides, Ti, Zr, Hf, **[Gr]Cr**, Mn, Fe, Co, Ni, Cu, and the oxides of said metals for forming the cathode, the anode, the current passage, the electrolyte, the interface and electrical insulating layers.

12. (AMENDED) A method for manufacturing a solid oxide electrolyte of the high-temperature fuel cell, comprising:

preparing an initial metal-organic compound, wherein the metal-organic compound for manufacturing the solid oxide electrolyte is synthesized using the reaction:

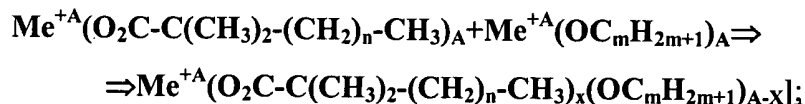


heating a ceramic electrode up to a predetermined temperature;

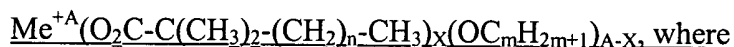
applying the prepared metal-organic compound onto the surface of the electrode;

[and]

thermally treating the electrode with the formed electrolyte[, wherein the metal-organic compound for manufacturing the solid oxide electrolyte is synthesized using the reaction:



forming a mixture, wherein components of said mixture are selected from the group consisting of metal carboxylates and metal alcoholates, having the [common] formula:



Me is a metal included in the functional component of the high-temperature fuel cell;

A is the valence of the given element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

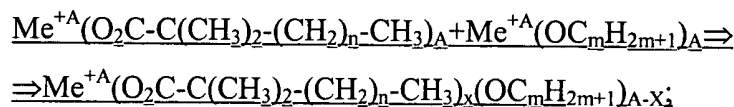
n is from 1 to 7; and

m is from 2 to 8.

15. (AMENDED) The method for manufacturing the solid oxide electrolyte according to Claim 12, wherein the step of synthesizing [the]a zirconium alcoholate $\text{Zr}(\text{OC}_m\text{H}_{2m+1})_4$ is performed during the interaction of [the]a zirconium mineral salt with [the]an alcohol and [the]a metallic calcium during boiling.

17. (AMENDED) A method for manufacturing a solid oxide electrolyte of the high-temperature fuel cell, comprising:

preparing an initial metal-organic compound, wherein the metal-organic compound for manufacturing the solid oxide electrolyte is synthesized using the reaction:

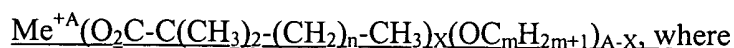


heating a ceramic electrode up to a predetermined temperature;

applying the prepared metal-organic compound onto the surface of the electrode;

thermally treating the electrode with the formed electrolyte;

forming a mixture, wherein components of said mixture are selected from the group consisting of metal carboxylates and metal alcoholates, having the formula:



Me is a metal included in the functional component of the high-temperature fuel cell;

A is the valence of the given element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8;

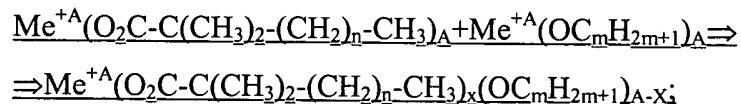
wherein the step of synthesizing a zirconium alcoholate $Zr(OC_mH_{2m+1})_4$ is performed during the interaction of a zirconium mineral salt with an alcohol and a metallic calcium during boiling and wherein the metal-organic compound comprising zirconium is modified by at least one element selected from the group consisting of Mg, Ca, Sc, Y, Ce and lanthanides, and wherein said metal-organic compound is applied onto the surface of a carrier cathode by a method selected from the group consisting of rolling, painting, and spraying a gas-liquid emulsion, while scanning the means applying the prepared composition along the cathode surface at a temperature of the heated cathode of 400 to 550°C, and**[The method for manufacturing the solid oxide electrolyte according to Claim 16,]** wherein the step of applying the metal-organic compound onto the heated surface of the ceramic cathode is performed with the growth rate of film thickness of 10 to 25 μm per hour.

20. (AMENDED) The method for manufacturing the solid oxide electrolyte according to Claim 12, wherein in order to increase the rate of applying the electrolyte film, a powder of **[the]**a modified zirconium dioxide is added to the metal-organic compound before applying said metal-organic compound to the surface of the electrode.

22. (AMENDED) The method for manufacturing the solid oxide electrolyte according to Claim 12, wherein the step of applying the metal-organic compound onto the heated surface of the ceramic electrode is performed in **[the]**an inert medium.

23. (AMENDED) A method for manufacturing a solid oxide electrolyte of the high-temperature fuel cell, comprising:

preparing an initial metal-organic compound, wherein the metal-organic compound for manufacturing the solid oxide electrolyte is synthesized using the reaction:



heating a ceramic electrode up to a predetermined temperature;

applying the prepared metal-organic compound onto the surface of the electrode;
thermally treating the electrode with the formed electrolyte;
forming a mixture, wherein components of said mixture are selected from the
group consisting of metal carboxylates and metal alcoholates, having the formula:
$$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_X(\text{OC}_m\text{H}_{2m+1})_{A-X}, \text{ where}$$

Me is a metal included in the functional component of the high-temperature fuel
cell;

A is the valence of the given element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8; and [The method for manufacturing the solid oxide electrolyte according to Claim 12,] wherein in order to obtain a proton electrolyte, preparing a mixture carboxylates, said mixture comprising at least one material of the chemical formula selected from the group consisting of $\text{SrCe}_{0.85}\text{Gd}_{0.15}[\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3]_6$ and $\text{BaCe}_{0.85}\text{Gd}_{0.15}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_6$, where n is 2 to 3, and said mixture is applied onto the electrode surface heated up to the temperature not higher than 470° , wherein forming a film of the proton electrolyte of the chemical formula selected from the group consisting of $\text{SrCeO}_{0.85}\text{Gd}_{0.15}\text{O}_3$ and $\text{BaCeO}_{0.85}\text{Gd}_{0.15}\text{O}_3$.

28. (AMENDED) The method according to Claim 25, wherein the mixture of liquid carboxylates comprises Cr, La, Sr, Mg, or Ca and wherein the concentration of Cr, La, Sr, Mg, Ca in the mixture of liquid carboxylates is from 20 to 110 g per kg.

29. (AMENDED) The method according to Claim 25, wherein the step of applying the current passage is performed by painting at the atmospheric pressure in [the]an air medium.

30. (AMENDED) The method according to Claim 25, wherein the step of applying the current passage is performed by spraying a prepared mixture of carboxylates in [the]an inert medium.

31. (AMENDED) A method for manufacturing a current passage of a high-temperature fuel cell, comprising:

synthesizing a powder of an electron-conductive material comprising doped lanthanum chromite;

producing an ultra-disperse mixture from the synthesized powder in organic carriers; and

applying the powder on the carrier cathode with thermal treatment, wherein the thin dispersion is produced by grinding the synthesized powder of the electron-conductive material of the doped lanthanum chromite until the ultra-disperse condition in the liquid medium of the mixture of metal-organic complexes of chrome, lanthanum and doping elements, and wherein the current passage film is manufactured by multiple steps of applying the thin dispersion onto the surface of the carrier cathode heated up to the temperature of forming, from the mixture of metal-organic complexes of chrome, lanthanum and doping elements, a gas-dense film of the doped lanthanum chromite of the composition similar to the thin-disperse powder synthesized individually[**The method according to Claim 25**], wherein the rate of thickness growth of the gas-dense film of the current passage on the surface of the carrier porous cathode is no less than 60 μm per hour.

36. (AMENDED) A method for manufacturing an interface layer, comprising:
synthesizing a metal-organic complex;
applying the metal-organic complex onto a heated substrate, said metal-organic complex comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_X$, where:

Me is a metal selected from the group consisting of Cr, Mn, Co, Ni, Cu, Y, Zr, La and lanthanides, Mg, Ca, Sr, and Ba;

A is the valence of the given chemical element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8[**The method according to Claim 33**],

wherein the step of applying the metal-organic complex onto a heated substrate, the substrate is heated up to a temperature not higher than 530°C in the air atmosphere, thereby forming a gas-dense film of the interface layer of no greater than 0.6 μm in thickness on the surface of the doped lanthanum chromite activating the electrode reaction.

39. (AMENDED) A method for manufacturing an interface layer, comprising:
synthesizing a metal-organic complex;

applying the metal-organic complex onto a heated substrate, said metal-organic complex comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_X$, where:

Me is a metal selected from the group consisting of Cr, Mn, Co, Ni, Cu, Y, Zr, La and lanthanides, Mg, Ca, Sr, and Ba;

A is the valence of the given chemical element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8[The method according to Claim 37],

wherein in order to manufacture the gas-dense film of anti-diffusive interface layer, a mixture of compounds is used comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_X$, where:

X is equal to 0;

Me is a metal selected from the group consisting of Ce and doping elements Sm, Gd; and

n is from 1 to 2; and

wherein the mixture is applied onto a substrate heated up to a temperature not higher than 380°C in an atmosphere of an inert gas forming a gas-dense anti-diffusive film of the interface layer of not greater than 10 μm in thickness on the surface of a doped cerium oxide.

42. (AMENDED) A method for manufacturing an interface layer, comprising:

synthesizing a metal-organic complex;

applying the metal-organic complex onto a heated substrate, said metal-organic complex comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_{A-X}(\text{OC}_m\text{H}_{2m+1})_X$, where:

Me is a metal selected from the group consisting of Cr, Mn, Co, Ni, Cu, Y, Zr, La and lanthanides, Mg, Ca, Sr, and Ba;

A is the valence of the given chemical element (metal);

X is a coefficient determined from the following inequality: $0 < X < A$;

n is from 1 to 7; and

m is from 2 to 8[The method according to Claim 40],

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wherein in order to manufacture the interface layer protecting a previous layer from a restorative gas medium, a mixture of compounds is used comprising the formula:

$\text{Me}^{+A}(\text{O}_2\text{C}-\text{C}(\text{CH}_3)_2-(\text{CH}_2)_n-\text{CH}_3)_A-\text{X}(\text{OC}_m\text{H}_{2m+1})_x$, where:

Me is a metal selected from the group consisting of Zr, Y, La and lanthanides;

A is the valence of the given chemical element (metal); and

X is an integer from 1 to A; and

further comprising the step of applying the mixture is performed by painting the substrate heated up to the temperature not higher than 430°C in the atmosphere of an inert gas forming a protective interface layer of not greater than 5 µm in thickness on the surface of the doped zirconium dioxide.

47. (AMENDED) The method according to Claim [44]45, wherein the concentration of metal selected from the group consisting of nickel and cobalt in said liquid phase of metal carboxylates is from 20 to 70 g per kg of the carboxylate.